WEST NILE VIRUS ENCEPHALITIS/MENINGITIS

Clinical Features: West Nile Virus (WNV) (and other arboviral) infections may be asymptomatic or may result in illness of variable severity, sometimes associated with central nervous system (CNS) involvement. When the CNS is affected, clinical syndromes ranging from febrile headache to aseptic meningitis to encephalitis may occur. WNV presents clinical features similar to other causative agents of meningitis and encephalitis. Meningitis is characterized by fever, headache, stiff neck, and pleocytosis. Encephalitis is characterized by fever, headache, and altered mental status ranging from confusion to coma with or without additional signs of brain dysfunction (e.g., paresis or paralysis, cranial nerve palsies, sensory deficits, abnormal reflexes, generalized convulsions, and abnormal movements).

Causative Agent: West Nile Virus, a flavivirus.

Mode of Transmission: WNV is transmitted by the bite of an infected mosquito; several species of mosquitoes are known to transmit WNV. West Nile Virus encephalitis/meningitis is an arboviral (arthropod-borne virus) disease. The natural transmission of WNV involves birds and mosquitoes. Mosquitoes transmit the virus obtained by feeding on infected birds. Several species of North American birds, including crow, blue jays, magpies and birds of prey appear to be especially likely to die if they contract the disease. Humans and horses do not circulate enough virus to re-infect a blood-feeding mosquito, and thus are referred to as "dead-end" or "accidental" hosts. Human-to-human transmission of West Nile Virus is exceptionally rare, but has occurred among blood and organ recipients.

Incubation Period: Ranges from 3 to 15 days (usually 6 days)

Period of Communicability: The virus is identified in geographic areas through testing of mosquito breeding pools and testing of dead birds from the previously identified species. When WNV has been found in either pools or birds it is an indicator of the presence of the virus in the geographic location. This usually occurs seasonally with the emergence of species of mosquitoes that have the capability of transmitting WNV.

Public Health Significance: Surveillance is important in understanding the impact of emerging infections. Emerging infections, as defined by the World Health Organization, include existing diseases spreading to new geographic areas or populations. As the name indicates, WNV's presence on the African continent had been known. It was first discovered in North America in 1999 - since that time, public health surveillance activities have tracked its movement across the country. Being a vector-borne disease, prevention is primarily accomplished through adopting personal behaviors to prevent being bitten by mosquitoes and reducing the sources and sites where mosquitoes breed. There is no human vaccine or PEP available.

Reportable Disease in Kansas Since: 2002

Laboratory Criteria for Surveillance Purposes

- Fourfold or greater change in virus-specific serum antibody titer, ***OR***
- Isolation of virus from or demonstration of specific viral antigen or genomic sequences in tissue, blood, cerebral spinal fluid (CSF), or other body fluid, ***OR***
- Virus specific immunoglobulin M (IgM) antibodies demonstrated in CSF by antibody-capture enzyme immunoassay (EIA), ***OR***
- Virus-specific IgM antibodies demonstrated in serum by antibody-capture EIA and confirmed by demonstration of virus-specific serum immunoglobulin G (IgG) antibodies in the same or a later specimen by another serologic assay (e.g., neutralization or hemagglutination inhibition).

Surveillance Case Definitions

- *Confirmed:* an encephalitis or meningitis case that is laboratory confirmed.
- *Probable:* an encephalitis or meningitis case occurring during a period when arboviral transmission is likely and with the following supportive serology:

    1) a single or stable (less than or equal to twofold change) but elevated titer of virus-specific serum antibodies; ***OR***

    2) serum IgM antibodies detected by antibody-capture EIA but with no available results of a confirmatory test for virus-specific serum IgG antibodies in the same or later specimen.

Comments

- KDHEL provided confirmatory testing for WNV specimens
- Tests that were inconclusive by state testing were sent to CDC.
- Because closely related arboviruses exhibit serologic cross-reactivity, positive results of serologic tests using antigens from a single arbovirus can be misleading.

Epidemiology and Trends

2005 Kansas Count: 9

	Rate per 100,000	*95% CI*
Kansas Rate	0.3	(0.1 – 0.5)
U.S. Rate (2004)	0.4	*NA*

In 2005, nine cases of WNV meningitis/encephalitis in humans were reported in Kansas. The three-year median for 2002-2004 was 22 cases. Incidence declined sharply after 2003; this is likely due to acquired immunity through exposure to the virus. Historically, neuroinvasive WNV cases have been reported most frequently among persons aged 50 years and older. In 2005, cases ranged from 21 to 82 years of age. The median age was 44 years.